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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/800,230 | 03/12/2004 | Kazuhito Matsuda | TOW-067 | 8565 |

959 7590 02/07/2007
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| EXAMINER |
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LAIOS, MARIA J

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| ART UNIT | PAPER NUMBER |
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1709

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 02/07/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/800,230

Applicant(s)

MATSUDA ET AL.

Examiner

Maria J. Laios

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) ____ is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 03122004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: On page 12 of the specification, line 12 the word efficiently should not be hyphenated.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3, 4, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Dickman et al (US 20030008186).

As to claim 1, Dickman discloses a fuel gas production apparatus for reforming a hydrogen-containing fuel to produce a hydrogen-rich fuel gas, comprising a reforming mechanism for reforming the hydrogen-containing fuel to obtain a reformed gas (230 and paragraph 94); a PSA mechanism (38) directly connected to said reforming mechanism (230) for removing impurities from said reformed gas to refine said reformed gas into said fuel gas, (paragraph 97); wherein said reforming mechanism (230) uses said hydrogen containing fuel, steam and oxygen to induce oxidation reaction and reforming

reaction simultaneously. While Dickman discloses wherein the reforming mechanism uses hydrogen containing fuel (16, paragraph 38), steam (paragraph 66) and oxygen (58), the material worked upon does not limit an apparatus claim. MPEP 2115.

As to claim 3, while Dickman discloses said hydrogen-containing fuel is methane (Paragraph 38) the material worked upon does not limit an apparatus claim. MPEP 2115.

As to claim 4, Dickman discloses a fuel cell system comprising (Figure 1, 10): a fuel gas production apparatus (Figure 1, 12 fuel processor) for reforming a hydrogen-containing fuel to produce a hydrogen rich fuel gas; and a fuel cell (Figure 1, 22 fuel stack) using said fuel gas (Figure 1, 14) supplied from said fuel gas production apparatus, wherein said fuel gas production apparatus comprises: a reforming mechanism (Figure 16, 230 and paragraph 94) for reforming the hydrogen-containing fuel to obtain a reformed gas; and a PSA mechanism (Figure 16, 38 and paragraph 97) directly connected to said reforming mechanism for removing impurities from said reformed gas to refine said reformed gas into said fuel gas, wherein said reforming mechanism uses said hydrogen containing fuel, steam and oxygen (Paragraph 39) to induce oxidation reaction and reforming reaction simultaneously. While Dickman discloses wherein the reforming mechanism uses hydrogen containing fuel (16, paragraph 38), steam (paragraph 66) and oxygen (58), the material worked upon does not limit an apparatus claim. MPEP 2115.

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As to claim 6, while Dickman discloses a fuel cell system according to claim 4, wherein said hydrogen-containing gas is methane (Paragraph 38) the material worked upon does not limit an apparatus claim. MPEP 2115.

4. Claim 7 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Dickman (US 20030008186).

While Dickman discloses an air delivery assembly (paragraph 33), Dickman fail to explicitly state that an air blower is used. It is either inherent or an obvious variant for an air delivery assembly to include a blower so that the air can in fact be delivered as required.

5. Claims 1 - 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Burch (US 20040101750).

As to claim 1, Burch discloses a fuel gas production apparatus for reforming a hydrogen-containing fuel to produce a hydrogen-rich fuel gas, comprising a reforming mechanism (32) for reforming the hydrogen-containing fuel to obtain a reformed gas; a PSA mechanism (52) directly connected (via 34, 37, 40) to said reforming mechanism (32) for removing impurities from said reformed gas to refine said reformed gas into said fuel gas; wherein said reforming mechanism (32) uses said hydrogen containing fuel, steam and oxygen to induce oxidation reaction and reforming reaction simultaneously (30, 51).

While Burch discloses wherein the reforming mechanism uses hydrogen containing fuel,

steam and oxygen to induce oxidation and reforming reaction simultaneously the material worked upon does not limit an apparatus claim. MPEP 2115.

As to claim 2, Burch discloses a fuel gas production apparatus further comprising a cooling mechanism (34) provided between the reforming mechanism (32) and the PSA (52).

As to claim 3, while Burch discloses the hydrogen-containing fuel is methane (Paragraph 57, last sentence) the material worked upon does not limit an apparatus claim. MPEP 2115.

As to claim 4, Burch discloses the a fuel cell system (28) comprising: a fuel gas production apparatus for reforming a hydrogen-containing fuel (30) to produce a hydrogen rich fuel gas (53); and a fuel cell (44) using said fuel gas supplied from said fuel gas production apparatus, wherein said fuel gas production apparatus comprises: a reforming mechanism (32) for reforming the hydrogen-containing fuel to obtain a reformed gas; and a PSA (52) mechanism directly connected (via 34, 37, 40) to said reforming mechanism (32) for removing impurities from said reformed gas to refine said reformed gas into said fuel gas, wherein said reforming mechanism (32) uses said hydrogen containing fuel (30), steam and oxygen (51) to induce oxidation reaction and reforming reaction simultaneously. The material worked upon does not limit an apparatus claim. MPEP 2115.

As to claim 5, Burch discloses a fuel cell system further comprising a cooling mechanism (34) provided between said reforming mechanism (32) and said PSA (52) mechanism.

As to claim 6, Burch discloses the hydrogen-containing fuel is methane (Paragraph 57, last sentence). The material worked upon does not limit an apparatus claim. MPEP 2115.

6. Claim 7 is rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Burch (US 20040101750).

While Burch discloses an air inlet stream (Figure 3) to the fuel stack (44, Figure 3), Burch fails to disclose the method used to transport air into the stack. It is either inherent or an obvious variant for there to be a blower to supply air to the fuel cell stack (44).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
9. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dickman (US 20030008186), as applied to claims 1 and 4 above, and further in view of Burch (US 20040101750).

The reference Dickman discloses the possible additional use of heat exchangers (paragraph 22, last sentence) however he does not specifically disclose the location of the heat exchangers as being located between the reforming mechanism and the PSA unit. Burch also discloses a fuel cell system, which includes an auto-thermal reformer (32), a heat exchanger (34, 40) and a PSA (52, Figure 3) unit and teaches that the heat produced by the system can be further utilized for a higher overall efficiency of the system (Paragraph 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to include the heat exchanger of Burch between the reformer and the PSA unit of Dickman in order to achieve thermal efficiency.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dickman (US 20030008186), as applied to claim 4 above, and further in view of Hirata (US 20020031458 A1).

With regard to claim 7, Dickman discloses an air steam entering the cathode region of the fuel cell stack (paragraph 32) but fails to disclose a blower. Hirata also discloses a fuel cell system with a fuel-processing unit and teaches the use of a compressor unit

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(28)/blower in order to effectively supply air to the fuel cell (paragraph 49). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the compressor/blower of Hirata for the transportation of air to the fuel cell of Dickman in order to effectively supply the required air.

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burch (US 20040101750), as applied to claim 4 above, and further in view of Hirata (US 20020031458 A1).

With regard to claim 7, Burch discloses an air stream (Figure 3) entering fuel cell stack (44) but fails to disclose the method to transport the air. Hirata also discloses a fuel cell system with a fuel-processing unit and teaches the use of a compressor unit (28)/blower in order to effectively supply air to the fuel cell (paragraph 49). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the compressor/blower of Hirata for the transportation of air to the fuel cell of Burch in order to effectively supply the required air.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria J. Laios whose telephone number is 571-272-9808. The examiner can normally be reached on Monday - Friday 7:30 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-9827. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJL 


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Supervisory Patent Examiner